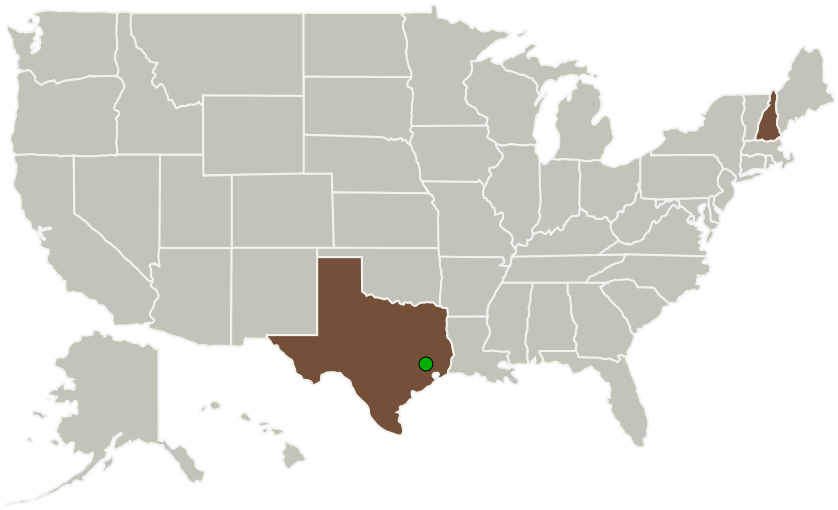
Long-Life, Hydrophilic, Antimicrobial Coating for Condensing Heat Exchangers, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

Environmental control systems for manned exploration spacecraft and lunar/planetary bases will need a condensing heat exchanger (CHX) to control humidity in crew habitat modules. Antimicrobial coatings are needed to prevent growth of microbes and formation of biofilms on the condensing surfaces inside the CHX and maintain a healthy spacecraft environment. Creare has developed a highly adherent, hydrophilic, antimicrobial coating that can be applied to heat exchanger surfaces. However, recent studies have shown that the lifetime of this coating may be limited in prototypical environments. We propose to develop an improved coating process that builds on our prior coating development but adds features to extend the lifetime, potentially to ten years. In Phase I we will prove the feasibility of our approach through theoretical studies of coating stability, deposition of trial coatings, analysis of the coatings, and measurement of coating performance after exposure to prototypical environments. In Phase II we will scale up and refine the process, produce prototypical CHX cores with the hydrophilic and antimicrobial coating, and demonstrate performance after extended exposure to prototypical environments.

Primary U.S. Work Locations and Key Partners



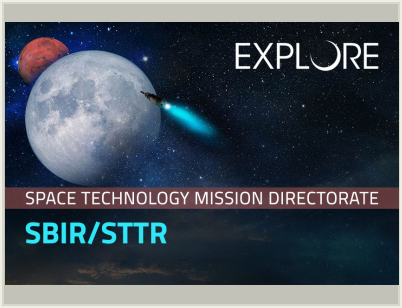


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Table of Contents

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Organizations Performing Work	Role	Type	Location
Creare LLC	Lead Organization	Industry	Hanover, New Hampshire
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
New Hampshire	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138261)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Creare LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Michael G Izenson

Co-Investigator:

Michael Izenson

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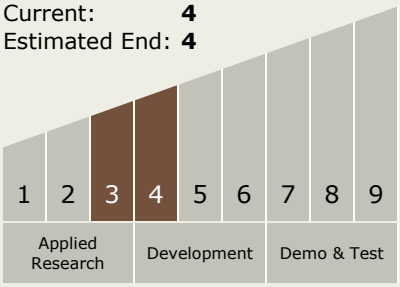
Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.5 Coatings

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System